

# Work related risk factors for musculoskeletal complaints in the spinning industry in Lithuania

Migle Gamperiene, Hein Stigum

## Abstract

**Objectives**—To describe the prevalence of self reported musculoskeletal complaints in the back, arms or neck, and legs among workers in the spinning industry, and to investigate the relations between these complaints and work related variables.

**Methods**—An interview based questionnaire survey was carried out in two spinning industry factories in Lithuania.

**Results**—The study group consisted of all workers in production (n=363). Symptoms of the legs were the musculoskeletal symptom reported most often (61%). Many subjects had arms or neck (55%) or back problems (28%). 20% Had experienced pain from all three sites. Almost 25% had had musculoskeletal pain every day and 16% had experienced constant pain during previous year. Packers had the highest risk of arms or neck problems whereas spinners had the highest risk of back or leg problems. Working in a strained posture (bending, work with arms raised up above shoulder level, and repetitive movements of the fingers) was associated with all three complaints. Only arms or neck complaints were associated with age.

**Conclusions**—Musculoskeletal disorders are a common problem among workers producing gobelin or synthetic thread in Lithuania and working in a strained posture is a risk factor for developing musculoskeletal disorders in three body sites: legs, arms or neck, and back. To better understand the different aspects of physical load as risk factors, a more detailed study of the frequency of postural changes as well as an observation of individually adopted postures would be necessary. This applies to intervention studies in factories of the spinning industry to prevent complaints of the legs and shoulders.

(*Occup Environ Med* 1999;56:411-416)

**Keywords:** musculoskeletal complaints; spinning; strained posture

Besides causing individual suffering, these disorders result in sick leave and early retirement pensions which entail heavy costs for companies.<sup>2</sup> Reducing musculoskeletal disorders is, therefore, a great public health concern. The goal is to be able to prevent the occurrence of musculoskeletal disorders.

Factory and office workers—for example, assembly line workers and keyboard operators—have been mentioned as occupational risk groups.<sup>3,4</sup> Prevalence figures for office workers have varied greatly between studies. A higher prevalence of musculoskeletal morbidity, both symptoms and clinical findings, was found among blue collar workers compared with white collar staff in the Finnish metal industry.<sup>5,6</sup>

The number of officially registered occupational musculoskeletal disorders in Lithuania is low compared with other countries—for example, Finland or Norway. However, the results of a study from a paper production factory in Vilnius, showed many work related disorders.<sup>7</sup> Twenty four work related musculoskeletal disorders were suspected in one factory alone. By contrast, only 43 cases of occupational musculoskeletal diseases were reported in the whole of Lithuania in previous year. This indicates that musculoskeletal disorders may be a large problem that is currently underreported in the official statistics in Lithuania. Light industry is the second biggest branch of industry (after agriculture) in Lithuania. We could not find other studies in which the broad range of work related variables was evaluated as a potential risk factor for musculoskeletal complaints among jobs in the spinning industry.

In short, the aims of this study were (a) to describe the occurrence of musculoskeletal disorders in two factories in the spinning industry, and (b) to analyse the relation between complaints in different parts of the musculoskeletal system and work related factors in different occupational groups.

## Subjects and methods

### STUDY GROUP

The study group consisted of 363 workers from two factories in the spinning industry. Almost all workers in the production line (363/398) participated in the study, giving a complete dataset. One factory produced gobelin, the other made synthetic threads. These two factories can be considered representative of this branch of industry. The machines in these factories run continuously and workers worked in four shifts. In these two factories we selected all departments where production was taking place.

Institute of Hygiene,  
Centre for  
Occupational  
Medicine, Vilnius,  
Lithuania  
M Gamperiene

National Institute of  
Public Health, Oslo,  
Norway  
H Stigum

Correspondence to:  
Dr Migle Gamperiene,  
University of Oslo, Institute  
of General Practice and  
Community Medicine,  
Department of Social  
Insurance Medicine, PO Box  
1130 Blindern, N-0317 Oslo,  
Norway. Telephone 0047 22  
85 06 09; fax 0047 22 85 06  
10.

Accepted 30 November 1998

Musculoskeletal disorders have become one of the main medical problems of the industrialised world. Indeed low back pain has pertinently been described as an epidemic.<sup>1</sup> Although the focus of interest has been low back pain, disorders of the upper back, including the neck and shoulders as well as the extremities, are receiving an increasing amount of attention.

## VARIABLES

Three outcome variables were constructed for the analysis, and described as presence or absence of discomfort in the arms or neck, legs, or back during the past year. The arms or neck variable was made up of five variables: neck, shoulders or upper arms, elbows or lower arms, and wrists and fingers. The variable back was made up of upper back and lower back. The legs variable was made up of three variables: thigh, knee or lower leg, and ankle or foot.

The explanatory variables included age, sex, occupation, and ergonomic risk factors. The 25 original occupational groups were recoded into four groups: spinners, maintainers, packers, and others according to the job task.

The ergonomic risk factors: sitting, standing still, using small instruments, bending, working with hands raised above shoulder level, working with bent head, with bent wrist, and with repetitive movements by fingers or hands, were recoded into dichotomous variables with the categories never or seldom and more often. The category more often was working time from 2 hours a workshift to nearly all the time. The ergonomic risk factors carrying or lifting 1–7 kg and carrying or lifting 8–30 kg were recoded to seldom or never and more often where seldom or never comprises carrying or lifting less than once an hour.

During the visits to workplaces we noticed that certain ergonomic risk factors tended to be together. To be able to serve spinning or weaving machines, the worker must work in a specific posture which often comprises bending, working with raised hands above shoulder level, and performing repetitive movements by fingers. Therefore these three ergonomic factors were combined into a variable named strained posture, with categories yes or no.

## METHODS

The data were collected by interview with a structured questionnaire. It included questions from a questionnaire used in the PRIM study.<sup>8</sup> It had four main parts: individual and employment related factors, disorders in the musculoskeletal system, physical workload, and psychosocial factors.

The Nordic musculoskeletal pain questionnaire was also included.<sup>9</sup> This standardised form, with a nominal yes or no scale, referred to 10 body areas. For each body area the subjects were asked whether they had felt discomfort, ache, or pain during the previous year, whether they had experienced pain during the past 7 days, and whether the pain had prevented them from doing their daily duties at home.

Also, the workers were asked to rate their experienced ergonomic risk factors on a 17 question standardised form with a five category scale from never or seldom to almost all the time. Questions about working postures were illustrated with figures.

Workers were assured that the data collected would be handled confidentially.

## STATISTICAL ANALYSES

The prevalence of musculoskeletal symptoms during the past year was estimated for arms or

Table 1 Number of men and women in each occupational group among 363 spinning industry workers in Lithuania in 1996

	Men	Women
Spinner	0	245
Maintainer	49	0
Packer	0	25
Others	4	40

neck, back, and legs. The significance of crude associations between the three outcome variables (discomfort in arms or neck, back, or legs) were tested with a  $\chi^2$  statistic. Variables that showed significant associations in the crude analyses at the 30% level were included in a multiple logistic regression analysis. Variables that showed an important association with the outcome variable were kept in the model. The results are presented as odds ratios (ORs) with 95% confidence intervals (95% CIs). The variable age was first categorised and the estimated regression coefficients ( $\beta$ s) were plotted versus category midpoints. The curve was quite close to linear, and age was entered as a continuous variable in the regression model. In the results, the OR for an increase in 10 years is given ( $OR_{+10} = \text{odds}_{v=a+10} / \text{odds}_{v=a}$ , where  $a$  is any number in the range of variable  $v$ ). Sex was not included in the final models because it was so strongly correlated with occupational group. As shown in table 1 there was not enough information to separate the effects of sex and occupation. It is then a matter of choice which variable should be included in the multiple regression analysis. We decided to use occupation. All analyses were conducted with the SPSS computer package version 7.0.

## Results

## STUDY GROUP

Participation rate was 91%. Few production line workers (35/398) did not want to participate or were not at the workplace for other reasons.

Among the participants 85% (309/363) were women workers (table 1). Mean age was 35 (SD 10.5, range 18–61) years. Mean duration of working day was 35 (SD 5.4) hours a week. Fifty nine workers (16.3%) had worked for  $\leq 1$  year. A hundred and fifty eight (43.5%) workers had worked  $> 10$  years in the present workplace and 92.8% of them were still doing the same task as when they began to work. Of the

Table 2 Prevalence and location of musculoskeletal complaints during the past year among 363 spinning industry workers in Lithuania 1996

Location	Prevalence (%)*
Arm and neck:	
Neck	16.5
Shoulder	27.0
Elbow or arm	16.0
Wrist or hand	26.4
Back:	
Upper back	13.2
Low back	28.4
Leg:	
Thigh	14.9
Knee or lower leg	39.4
Ankle or foot	30.9

\*Percentages do not sum to 100 because of overlap.

Table 3 Number of subjects who had arm or neck, back, leg pain, or combinations during previous 12 months among 363 spinning industry workers in Lithuania in 1996

Arm or neck symptoms	Back symptoms	Leg symptoms	
		No	Yes
No	No	75	44
	Yes	17	28
Yes	No	33	77
	Yes	16	73

interviewed group 80% (292) had never had treatment for musculoskeletal problems.

The emphasis on various work tasks varied from department to department, but the main work task was service of spinning and weaving machines. Among the participants, 67.5% were spinners (245/363), 13.5% (49) were maintainers, 6.9% (25) were packers, and the rest 12.1% (44) was grouped as others (table 1). The ratio of women varied with occupation groups, all spinners and all packers were women, all maintainers were men, the ratio of women in the others group was 91% (40/44). The main task of packers was to pack the products—bobbins weighing 7 kg.

#### PREVALENCE OF MUSCULOSKELETAL PROBLEMS

In the study group 288 (79.3%) had experienced musculoskeletal symptoms during the past 12 months. Two hundred and four (83.3%) spinners, 22 (88.0%) packers, and 28 (57%) maintainers reported musculoskeletal disorders in at least one body part.

Symptoms of the legs were the most common musculoskeletal symptoms in spinning industry workers. Complaints of the legs in general were mentioned by 61.2%; 39.4% of the respondents had knee or lower leg complaints and 30.9% ankle or foot complaints. A large proportion of subjects had complaints of the arms or neck that were mostly in the shoulders or upper arm region (27%). Back problems were mentioned mainly because of the lower back (28.4%) (table 2).

There was considerable overlap between the three main regions. Most workers had symptoms at various sites and most often complained of a combination of symptoms from the arms or neck and legs (table 3). The combination of symptoms in more local areas—such as shoulder and lower leg (15%), lower back and lower leg (15%), and lower back and foot (14%) were more frequent than others. Among the symptoms of the neck or arms the neck and shoulders (8.0%) and the neck and wrists together (8.0%) were less frequent. A large proportion of workers (16%) had complaints in the neck, lower back, and lower legs at the same time.

During the past week 54.8% (199) had had musculoskeletal complaints: 26.7% and 19.6% of the lower leg and foot, respectively. Several workers continued to work while complaining about the lower back (17.6%) and about the wrists (15.7%). Almost 25% had had musculoskeletal pain every day and 16% had experienced almost constant pain during the previous

Table 4 Crude relation between arm, neck, back, or leg complaints, by personal and work characteristics among 363 spinning industry workers in Lithuania in 1996 (*p* values for difference between categories)

Risk factors	n	Arm or neck (%)	p Value	Back (%)	p Value	Leg (%)	p Value
All	363	54.8		36.9		61.2	
Sex:			<0.001		0.02		<0.001
Men	54	27.8		22.2		38.9	
Women	309	59.5		39.5		65.0	
Age:			<0.001		0.6		0.6
18–25	68	39.7		42.6		57.4	
26–30	58	43.1		31.0		55.2	
31–40	119	56.3		37.0		64.7	
41–61	116	68.1		36.2		62.9	
Occupational group:			<0.001		0.01		<0.001
Spinners	245	55.9		42.4		68.6	
Maintainers	49	30.6		22.4		40.8	
Packers	25	76.0		36.0		52.0	
Others	44	63.6		22.7		47.7	
Work with light instruments:			0.4		0.06		
Seldom or never	150	57.3		31.3		58.7	0.4
More often	213	53.1		40.8		62.9	
Lifting or carrying 1–7 kg:			<0.001		0.05		0.1
Seldom or never	100	39.0		29.0		51.0	
More often	263	60.8		39.9		65.0	
Lifting or carrying 8–30 kg:			0.006		0.2		0.06
Seldom or never	316	57.6		38.3		63.0	
More often	47	36.2		27.7		48.9	
Bending:			0.8		0.02		0.01
Seldom or never	32	53.1		18.8		40.6	
More often	323	55.4		39.3		63.8	
Raised hands:			<0.001		0.02		<0.001
Seldom or never	45	28.9		22.2		35.6	
More often	310	59.0		39.7		65.5	
Bent neck:			0.02		0.06		0.008
Seldom or never	38	36.8		23.7		42.1	
More often	317	57.4		39.1		64.0	
Bent wrist:			0.02		0.2		0.2
Seldom or never	15	26.7		20.0		46.7	
More often	340	56.5		38.2		62.4	
Repetitive movements by fingers:			0.02		0.4		0.08
Seldom or never	15	26.7		26.7		40.0	
More often	340	56.5		37.9		62.6	
Strained posture:			0.001		0.01		<0.001
Seldom or never	70	37.1		24.3		42.9	
More often	285	59.6		40.7		66.3	

Table 5 Adjusted prevalence odds ratios (95% CIs) for arm, neck, back, or leg complaints, by personal and work characteristics among 363 spinning industry workers in Lithuania in 1996

Risk factors	Arm or neck		Back		Leg	
	Odds ratio	(95% CI)	Odds ratio	(95% CI)	Odds ratio	(95% CI)
Age:						
≥10 y	1.5	(1.2 to 1.8)	—		—	
Occupation group:						
Spinners	2.7	(1.3 to 5.5)	2.5	(1.2 to 5.1)	3.1	(1.6 to 5.8)
Maintainers (reference)	1.0		1.0		1.0	
Packers	5.7	(1.8 to 18.5)	2.0	(0.7 to 5.7)	1.6	(0.6 to 4.4)
Others	4.0	(1.6 to 9.9)	1.0	(0.4 to 2.7)	1.6	(0.7 to 3.8)
Sitting:						
Seldom or never (reference)	—		—		1.0	
More often	—		—		0.3	(0.1 to 0.8)
Lifting or carrying 1 to 7 kg:						
Seldom/never (reference)	1.0		—		—	
More often	1.7	(1.0 to 3.1)	—		—	
Lifting or carrying 8 to 30 kg:						
Seldom or never (reference)	1.0		—		—	
More often	0.6	(0.3 to 1.2)	—		—	
Strained posture:						
No (reference)	1.0		1.0		1.0	
Yes	2.4	(1.3 to 4.3)	1.9	(1.1 to 3.5)	2.1	(1.2 to 3.7)

year. Only a few (19.6%) of the subjects had sought medical care: 3.6% and 2.8% of those with lower leg and foot complaints respectively, 5.0% of those with shoulder and upper arm complaints, and 7.7% of those with lower back complaints.

#### CRUDE ASSOCIATIONS

Complaints about the arms or neck were higher in the older age groups (table 4). Packers reported most arm or neck problems, maintainers the least. Lifting or carrying weights of 1–7 kg was often associated with arm or neck problems. Surprisingly, lifting heavier weights was often protective. Working with raised hands, bent neck, or bent wrists was also associated with problems of the arms or neck. Further, those who repetitively moved fingers or hands had more neck and arm problems.

Women had twice as many back problems as men. Prevalence of back problems did not increase with age. Spinners had more back problems than the other occupations. Both lifting light weights and bending was associated with back problems. Subjects working with raised hands or bent neck had more back problems than those who did not. Also, working with instruments (<100 g) or with bent wrist was associated with back problems. This is probably because of the specific working posture associated with this type of work. In the multivariate analysis these two associations disappeared.

Women had more leg problems than men. As with back problems, the spinners were the most afflicted by complaints about the legs. Maintainers had the least leg problems. People who had to bend often, or people who worked with raised hands or with repetitive finger movements, all had more leg problems than those who did not. When these three variables were combined into the posture variable, subjects with strained posture had significantly more leg problems than those without strained posture. Working often with a bent neck was also associated with leg problems.

#### MULTIPLE REGRESSION ANALYSES

From the multiple regression analyses, age, occupation group, lifting or carrying weights, and strained posture contributed to arm or neck problems (table 5). The odds of arm or neck problems increased by a factor of 1.5 (1.2–1.8) for every 10 years increase in age. This means that compared with a 20 year old worker, a 40 year old worker had 2.1 (1.4–3.4) times as many problems of the arms or neck. Spinners had close to three times as many problems of the arms or neck as maintainers, whereas packers had nearly six times as many problems as the maintainers. (Odds ratio is used as an approximation to relative risk. But because the underlying prevalence of symptoms is high, the OR may be much higher than the relative risk (RR)). People who lifted small weights often had more problems of the arms or neck than those who lifted seldom or never. Somewhat surprisingly, people who lifted heavy weights (30 kg) often had less problems than those who lifted seldom or never. Working with strained posture was clearly associated with problems of the arms or neck.

Only occupational group and posture contributed to back problems. When controlling for posture, spinners had most back problems followed closely by packers. People working with strained posture had nearly twice as many back problems as those who did not.

Occupational group, posture, and sitting contributed to leg problems. As for back problems, spinners had the most problems and maintainers had the least. People working with the strained posture had about twice as many leg problems as those who did not. People who were often sitting had only one third as many leg problems as those who sat seldom or never.

#### Discussion

This study of 363 workers in two light industry factories showed that nearly 80% reported some form of musculoskeletal discomfort during the previous year. The prevalence of complaints of the legs was the highest (61%), followed by neck or arms (55%). A somewhat



lower proportion, 37%, reported back problems. Twenty per cent of the workers had complaints in all three sites. For all three outcomes maintainers had the least problems, whereas packers and spinners had the most. Subjects working in a strained posture had about twice the risk of developing musculoskeletal discomfort in all three body sites.

Musculoskeletal disorders in this type of industry have not been studied previously in Lithuania. Most reports on musculoskeletal disorders from other countries come from construction, nursing, forestry, or office workers. The prevalence of musculoskeletal disorders reported from forestry and construction is higher than in our study, 88% and 92% respectively.<sup>10 11</sup> A lower prevalence has been reported from nursing (57%).<sup>12 13</sup>

The two chosen factories are not different from other factories in Lithuania, carrying out the same type of production. Our results should therefore be representative of this type of industry in Lithuania.

All workers selected for the study agreed to participate; therefore we have no selection bias.

The working conditions were characterised by high stability. Few workers had changed work tasks over time, therefore an underestimation of the prevalence of musculoskeletal discomforts due to a healthy worker effect is not likely in this study.

Spinners, the main occupational group serving the spinning machines, spend a lot of time walking or standing in the strained posture. Therefore we see a high prevalence of problems of both the legs and neck and arms.

Arm or neck complaints were positively associated with age in our study. Similar results have been found in many studies in the nursing profession.<sup>12</sup> By contrast with results from forestry and nursing, however, back or leg problems did not increase with age in our study. No clear conclusion about the role of aging in relation to low back pain can be drawn from other studies. Some studies from the nursing profession found a positive association,<sup>13-15</sup> whereas other studies found that age was not positively associated with,<sup>16-18</sup> or that it was even weakly negatively associated with, low back pain.<sup>19</sup> Among construction workers, age is a main risk factor for low back pain.<sup>11</sup> The association between complaints of the arms and neck and age emphasises the necessity of organising less strenuous working tasks for older workers in light industries.

The estimated prevalence may be too low because of recall bias. Subjects who had no complaints at the time of interview may have forgotten episodes of their illness in the past year. A bias because we missed workers on sick leave must have been small, as the average sick leave was <3 days a year. Subjects with latent or existing complaints may report more adverse working conditions than others. Because of the way we recoded these into dichotomous variables, we think that this should not result in an associated bias.

In cross sectional studies causal interpretations of the associations found are difficult. However, it is reasonable to conclude that

variables—such as strained posture (bending, work with arms raised up above shoulder level, and repetitive movements of the fingers)—lead to the problems in all three body sites among workers in the spinning industry.

It seems worthwhile to pay more attention to symptoms at these anatomical sites in future studies. There could be individual differences in the actual posture adopted for a given task. To better understand the different aspects of physical work load as risk factors, a more detailed study of the frequency of postural changes as well as an observation of individually adopted postures would be necessary. This applies also to intervention studies, which often focus on the prevention of complaints at one particular anatomical site, mainly low back pain. In such studies of jobs in the spinning industry, confirmation should be sought that for instance alternative lifting techniques or other changes in working conditions do not pose a threat to other parts of the body—for example, shoulders or legs.

Because of high rates of symptoms but very low rates of lost time and the low percentage of workers seeking treatment, ergonomic interventions could be effective on self reported musculoskeletal symptoms of pain and discomfort associated with work.

## Conclusions

Musculoskeletal disorders are a common problem among workers producing gobelin or synthetic thread in Lithuania. Problems of the legs and arms and neck are the most common, followed by back problems. Many workers have problems in all three sites. In this study only arm or neck problems seem to increase with age. Working in a strained posture specific for this type of industry (bending, working with raised hands above shoulder level, and performing repetitive movements by fingers) is a risk factor for developing musculoskeletal disorders in all three body sites. The present study forms a basis for intervention studies directed at reducing the effects of these risk factors.

We thank technical staff at the spinning factories for their skilled practical assistance.

- 1 Nachemson AL, Andersson GBJ. Classification of low-back pain. *Scand J Work Environ Health* 1982;8:134-6.
- 2 Bigos SJ, Spengler DM, Martin NA. Back injuries in industry: a retrospective study. *Spine* 1986;11:246-51.
- 3 Maeda K. Occupational cervicobrachial disorder and its causative factors. *J Hum Ergol* 1977;6:193-202.
- 4 Hagberg M, Weegman DH. Prevalence rates and odds ratios of shoulder-neck diseases in different occupational groups. *Br J Ind Med* 1987;44:602-10.
- 5 Leino P, Hasan J, Karppi S. Occupational class, physical workload, and musculoskeletal morbidity in the engineering industry. *Br J Ind Med* 1988;45:672-81.
- 6 Leino P, Magni G. Depressive and distress symptoms as predictors of low back pain, neck-shoulder pain, and other musculoskeletal morbidity: a 10-year follow-up of metal industry employees. *Pain* 1993;53:89-94.
- 7 Jankauskas R, Gamperiene M. Prevalence of diseases in Vilnius paper production factory. *Proceedings of an International Symposium "From Research to Prevention"*. Helsinki: National Institute of Occupational Health, 1995:137.
- 8 Questionnaire "Workplace, health and life course". PRIM study. Copenhagen: Institute for Occupational Health in Copenhagen, 1994. (In Danish.)
- 9 Kuorinka I, Jonsson B, Kilbom Å, et al. Standardized Nordic questionnaire for the analysis of musculoskeletal symptoms. *Applied Ergonomics* 1987;18:233-7.

- 10 Birger KH. *Physical work load and perceived exertion during forest work and experimental repetitive lifting* [thesis]. Stockholm: Karolinska Institute, 1994.
- 11 Holmström E. *Musculoskeletal disorders in construction workers related to physical, psychosocial and individual factors* [thesis]. Lund: Lund University, 1992.
- 12 Engels JA, van der Gulden JWJ, Senden ThF, et al. Work related risk factors for musculoskeletal complaints in the nursing profession: results of a questionnaire survey. *Occup Environ Med* 1996;**53**:636–41.
- 13 Eighton DJ, Reilly T. Epidemiological aspects of back pain: the incidence and prevalence of back pain in nurses compared to general population. *Occup Med* 1995;**45**:263–7.
- 14 Niedhammer I, Lert F, Marne MJ. Back pain and associated factors in French nurses. *Int Arch Occup Environ Health* 1994;**66**:349–57.
- 15 Zwart BCH, Fring-Dresen MHW, van Dijk FJH. Physical workload and the ageing worker: a review of the literature. *Int Arch Occup Environ Health* 1995;**68**:1–12.
- 16 Harber P, Billet E, Lew M, et al. Importance of nonpatient transfer activities in nursing-related back pain: I questionnaire survey. *J Occup Med* 1988;**29**:967–70.
- 17 Lagerström M, Wenemark M, Hagberg M, et al. Occupational and individual factors related to musculoskeletal symptoms in five body regions among Swedish nursing personnel. *Int Arch Occup Environ Health* 1995;**68**:27–35.
- 18 Mandel JH, Lohman W. Low-back pain in nurses: the relative importance of medical history, work factors, exercise and demographics. *Res Nurs Health* 1987;**10**:165–70.
- 19 Skovron ML, Mulvihill M, Sterling R, et al. Work organization and low back pain in nursing. *Ergonomics* 1987;**30**:359–66.

## Correspondence and editorials

*Occupational and Environmental Medicine* welcomes correspondence relating to any of the material appearing in the journal. Results from preliminary or small scale studies may also be published in the correspondence column if this seems appropriate. Letters should be not more than 500 words in length and contain a minimum of references. Tables and figures should be kept to an absolute

minimum. Letters are accepted on the understanding that they be subject to editorial revision and shortening.

The journal also publishes editorials which are normally specially commissioned. The Editor welcomes suggestions regarding suitable topics; those wishing to submit an editorial, however, should do so only after discussion with the Editor.